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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/939,716	08/28/2001	Kazushige Yonenaga	011070	2708

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ARMSTRONG, KRATZ, QUINTOS, HANSON & BROOKS, LLP
1725 K STREET, NW
SUITE 1000
WASHINGTON, DC 20006

EXAMINER	
LEUNG, WAI LUN	

ART UNIT	PAPER NUMBER
2613	

DATE MAILED: 07/19/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/939,716	YONENAGA ET AL.	
	Examiner	Art Unit	
	Danny Wai Lun Leung	2613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *5/8/2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *13, 17-21* is/are allowed.

6)☒ Claim(s) *1-9,14 and 15* is/are rejected.

7)☒ Claim(s) *10-12 and 16* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *8/28/2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claims 1 and 7 have been considered but are moot in view of the new ground(s) of rejection.

2. Applicant did not make any arguments regarding to claims 2-6, 8, 9, 14, and 15 other than the fact that they are dependent upon claims 1 or 7.

3. Accordingly, claims 1-9, 14 and 15 are rejected under new grounds of rejections.

4. Applicant's appreciation of the telephone interview grated March 13, 2006 is noted. During the interview, applicant was advised of **MPEP 508.04(R-3)** regarding to procedures as set forth regarding to replacement of missing/lost documents in file such as the Priority document; applicant was also advised of the fact that evidence submitted to overcome the rejection under the first paragraph of 35 USC 112 by the applicant is considered admitted prior art as applicant stated that it is common and well known, as stated in reply filed 5/8/2006 page 14-16, it is being used as a ground of rejection for claim 8, if applicant traverse such admission, rejection under the first paragraph of 35 USC 112 will be reinstated and the action will be made final.

5. Accordingly, 35 USC 112 first paragraph rejections are hereby withdrawn, upon the condition that applicant will not make contradictory remarks to the admission filed.

6. Applicant stated on page 16 of reply filed 5/8/2006 that *the term "type" is a common and well known feature of which one of ordinary skill in the art would be reasonably apprized.* As such, the term "type" is being interpreted to the broadest reasonable way of which one of ordinary skill in the art would be reasonably apprized in this office action. Specifically "Mach

Zehnder interferometer modulator" and/or modulators containing "$LiNbO_3$ substrates" or any other semiconductor substrates that transmit traveling wave are being read as "traveling wave type electrode".

7. Applicant further amended claim 8 to eliminate the recitation of a "use". Accordingly, all 35 USC 112 second paragraph rejections, and USC 101 rejection to claim 8 are hereby withdrawn.

8. Claims 13, 17-21 were previously indicated as allowable if 112 problems are resolved. Accordingly, claims 13, 17-21 are allowed.

Priority

9. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Claim Rejections - 35 USC § 103

10. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

11. Claims 1-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent Number 5,543,952 to **Yonenaga** et al.

Regarding to claim 1, Yonenaga discloses an optical transmitter (fig 1b) comprising:

an input terminal (col 3, ln 34) for accepting an electrical binary signal (col 3, ln 35),

bandwidth restriction means for restricting bandwidth of said electrical binary signal (col 4, ln 14-16),

an electrical-optical conversion means for converting said electrical signal which is bandwidth restricted by said bandwidth restriction means to an optical signal (col 3, ln 37-45).

Yonenaga does not disclose expressly having an amplifier for amplifying an input signal of said electrical-optical conversion means so that said input signal has enough level for operating said electrical-optical conversion means, and wherein said bandwidth restriction means locates between an output of said amplifier and an input of said electrical-optical conversion means.

Absent any teaching of criticality, it would have been an engineering design choice to place an amplifier anywhere along a communication link to improve signal quality wherever and whenever needed. Therefore, it would have been obvious for a person of ordinary skill in the art at the time of invention to have an amplifier for amplifying an input signal of Yonenaga's electrical-optical conversion means so that said input signal has enough level for operating said electrical-optical conversion means, and wherein Yonenaga's bandwidth restriction means locates between an output of said amplifier and an input of said electrical-optical conversion means as it is a common and well known design choice to place amplifier anywhere along a communication link. The motivation for doing so would have been to improve signal quality.

Regarding to claim 2, Yonenaga discloses an optical transmitter wherein a precoding means (80, fig 1B) is provided at an input stage, said precoding means provides a binary output which is the same as the previous output when an input binary digital signal is 0, and an output which differs from the previous output when an input digital signal is 1 (col 5, ln 59-65), and said bandwidth restriction means is a low- pass filter which generates a ternary duobinary signal (75b, fig 1B; col 6, ln 50-54).

Regarding to claim 3, Yonenaga discloses an optical transmitter wherein said electrical-optical conversion means provides the maximum level of optical output for an input electrical

signal having the maximum level and the minimum level (col 9, ln 23-32), the minimum level of optical output for an input electrical signal having middle level between said maximum level and said minimum level (col 9, ln 23-32), and optical phase of said maximum level of said optical signal is opposite of optical phase of said minimum level of said optical signal (col 9, ln 29).

Regarding to claim 4, Yonenaga discloses an optical transmitter wherein said electrical-optical conversion means is a Mach Zehnder light intensity modulator having a pair of electrodes which are driven by ternary electrical duobinary signals having opposite polarities (col 8, ln 32-39).

Regarding to claim 5, Yonenaga discloses an optical transmitter wherein at least two of said bandwidth restriction means, and said electrical-optical conversion means are integrated in a single module (fig 1B, where everything is in one module). Since it is a common and well known design choice to put amplifiers anywhere along a communication link, it would have been obvious to incorporate such amplifier in the module as well.

12. Claims 6-7, 9, 14, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent Number 5,543,952 to Yonenaga et al, as applied to claims 1 and 5 above, in view of US Patent Number 5,644,664 to Burns et al.

Regarding to claim 6, Yonenaga discloses an optical transmitter in accordance to claim 5 contains electrical-optical conversion means, but does not disclose expressly that the electrical-optical conversion means has function as bandwidth restriction means. Burns, from the same field of endeavor, discloses an optical transmitter contains electrical-optical conversion means that has function as the bandwidth restriction means (col 9, ln 38-39). Therefore, it would have

been obvious to a person of ordinary skill in the art at the time of invention to incorporate Burns' electrical-optical conversion means that has function as bandwidth restriction means with Yonenaga's optical transmitter in order to restrict bandwidth by using the electrical-optical conversion means without additional filtering components in the system such that the size and cost of the transmitter could be lowered.

Regarding to claim 7, Yonenaga discloses an optical transmitter (fig 1B) comprising:

an input terminal (col 3, ln 34) for accepting an electrical binary signal (col 3, ln 35),

an electrical-optical conversion means (col 3, ln 37-45) for converting an electrical signal to an optical signal,

Yonenaga does not disclose expressly having an amplifier for amplifying an input signal applied to the input terminal to level requested for operating an electrical-optical conversion means, and applying the amplified electrical signal to the electrical-optical conversion means. However, absent any teaching of criticality, it would have been an engineering design choice to have an amplifier anywhere along a communication link to amplify the signals for the same reasons as stated above regarding claim 1.

Yonenaga does not disclose expressly that the electrical-optical conversion means have a traveling wave type electrode operating to restrict bandwidth of an output light of the electrical-optical conversion means. Burns, from the same field of endeavor, discloses an electrical-optical conversion means having a traveling wave type electrode operating to restrict bandwidth of an output light of an electrical-optical conversion means (col 4, ln 16-33). Therefore, it would have been obvious to a person of ordinary skill in the art at the time of invention to incorporate Burns' electrical-optical conversion means with Yonenaga's optical transmitter in order to restrict

bandwidth by using the electrical-optical conversion means without additional filtering components in the system such that the size and cost of the transmitter could be lowered.

Regarding to claim 9, the combination of Yonenaga and Burns teaches an optical transmitter according to claim 6 or claim 7 as discussed above. Yonenaga further teaches that the electrical-optical conversion means is a Mach Zehnder light intensity modulator having a traveling wave type electrode (col 8, ln 31-39). Burns further teaches that the bandwidth of optical output of the mach Zehnder light intensity modulator is restricted by using mismatching of phase velocity of electric wave (col 9, ln 38-39) propagating the traveling wave type electrode and optical wave propagating in an optical waveguide having refractive index depending upon electrical field generated by the electric wave (col 12, ln 16-27).

Regarding to claim 14, Burns further teaches an optical transmitter in accordance to claim 9, wherein said Mach Zehnder Light intensity modulator is provided on a substrate of Z-cut Lithium-Niobate (col 11, ln 7).

Regarding to claim 15, Burns further teaches an optical transmitter in accordance to claim 9, wherein said Mach Zehnder light intensity modulator is provided on a substrate of X-cut Lithium-Niobate (col 11, ln 7).

13. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent Number 5,543,952 to Yonenaga et al, in view of US Patent Number 5,644,664 to Burns et al., as applied to claims 1 and 7 above, and further in view of "Modeling and Optimization of Traveling-Wave $LiNbO_3$ Interferometric Modulators" by Chung et al, IEEE Journal of Quantum Electronics, Vol 27, No 3, March 1991.

Regarding to claim 8, the combination of Yonenaga, Burns, and Sicard discloses the optical transmitter in accordance to claims 1 and 7 as discussed above. It does not disclose expressly wherein said electrical-optical conversion means is a Mach Zehnder Light intensity modulator having a traveling wave type electrode, and bandwidth of optical output of said Mach Zehnder light intensity modulator is restricted by using loss of said traveling wave type electrode. Chang, from the same field of endeavor, teaches an electrical-optical conversion means is a Mach Zehnder Light intensity modulator having a traveling wave type electrode *(page 612, section III)*, and bandwidth of optical output of said Mach Zehnder light intensity modulator is restricted by using loss of said traveling wave type electrode *(page 613, sections A describes relationships between loss of traveling wave type electrode and its bandwidth; section B describes its parameters being used to drive the modulator)*. Therefore, it would have been obvious for a person of ordinary skill in the art at the time of invention to implement Chang's technique to restrict bandwidth of optical output of said Mach Zehnder light intensity modulator by using loss of said traveling wave type electrode onto the combination of Yonenaga, Burns, and Sicard's system as taught by Chang. The motivation for doing so would have been to be able to simplify optimization procedures by determining the set of parameters that will satisfy the given bandwidth requirement to restrict bandwidth of optical output of said Mach Zehnder light intensity modulator by using loss of said traveling wave type electrode *(Chang, page 616, section V)*.

14. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent Number 5,543,952 to Yonenaga et al, in view of US Patent Number 5,644,664 to Burns et al., as applied

to claims 1 and 7 above, and further in view of applicant's admission on page 14-16 of in reply filed 5/8/2006.

Regarding to claim 8, the combination of Yonenaga, Burns, and Sicard discloses the optical transmitter in accordance to claims 1 and 7 as discussed above. It does not disclose expressly wherein said electrical-optical conversion means is a Mach Zehnder Light intensity modulator having a traveling wave type electrode, and bandwidth of optical output of said Mach Zehnder light intensity modulator is restricted by using loss of said traveling wave type electrode. However, applicant admitted that it is common and well known to use an electrical-optical conversion means such as a Mach Zehnder Light intensity modulator having a traveling wave type electrode to restrict bandwidth of optical output of said Mach Zehnder light intensity modulator by using loss of said traveling wave type electrode. Therefore, it would have been obvious for a person of ordinary skill in the art at the time of invention to restrict bandwidth of optical output of said Mach Zehnder light intensity modulator by using loss of said traveling wave type electrode onto the combination of Yonenaga, Burns, and Sicard's system as taught by applicant's admission. The motivation for doing so would have been to be able to simplify optimization procedures by determining the set of parameters that will satisfy the given bandwidth requirement to restrict bandwidth of optical output of said Mach Zehnder light intensity modulator by using loss of said traveling wave type electrode.

Allowable Subject Matter

15. Claims 13, and 17-21 are allowed as indicated in previous office action.

16. Claims 10-12, and 16 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

17. The prior art made of record in previous actions and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Danny Wai Lun Leung whose telephone number is (571) 272-5504. The examiner can normally be reached on 9:30am-7:00pm Mon-Thurs.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ken Vanderpuye can be reached on (571) 272-3078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

DWL
July 11, 2006

KENNETH VANDERPUYE
SUPERVISORY PATENT EXAMINER